

IN THE CLAIMS

1. (canceled)
2. (previously amended) The watercraft of claim 55 ~~claim 1~~ wherein said wings are adapted to move with their trailing edge upwards to submerge said watercraft at said dive speed and retain the submerged condition at a submerged speed.
3. (previously amended) The watercraft of claim 55 ~~claim 1~~ in which said wings have movable trailing edge flaps which are adapted to move upwards to generate a downward hydrodynamic force and downwards to generate a lifting force.
4. (canceled)
5. (canceled)
6. (canceled)
7. (previously amended) The watercraft of claim 55 ~~claim 6~~ in which the span of said flap is approximately equal to the beam at the rearward end of said elongated body.
8. (original) The watercraft of claim 7 with the chord of said flap being no less than approximately 2.5% of the length of said elongated body.
9. (canceled).
10. (canceled).
11. (canceled).
12. (canceled).
13. (previously amended) The watercraft of claim 55 ~~claim 6~~ in which said trailing edge flaps and said wings are adapted to be moved in coordinated fashion to accomplish pitch and path

1 control, with the trailing edge of said flap moving in opposite direction to the trailing edges of said
2 wings.

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4 14. (previously amended) The watercraft of claim 55 ~~claim 6~~ in which the trailing edge
5 of said flap and said wings are adapted to be moved in the same direction to accomplish changes in
6 heave.

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8 15. (canceled).

9 16. (canceled).

10 17. (canceled).

11 18. (canceled).

12 19. (canceled).

13 20. (canceled).

14 21. (canceled).

15 22. (canceled).

16 23. (canceled).

17 24. (canceled).

18 25. (canceled).

19 26. (canceled).

20 27. (canceled).

21 28. (canceled).

22 29. (canceled).

23 30. (canceled).

24 31. (canceled).

25 32. (canceled).

26 33. (canceled).

27 34. (canceled).

1 35. (canceled).
2 36. (canceled).
3 37. (canceled).
4 38. (canceled).
5 39. (previously amended) The watercraft of claim 63 ~~claim 38~~ wherein said triangular
6 profile in side view is modified to be polygonal above the water plane, with the principal surfaces
7 of said upper body portion being faceted between planview and profile.
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9 40. (canceled).
10 41. (canceled).
11 42. (canceled).
12 43. (canceled).
13 44. (canceled).
14 45. (canceled).
15 46. (previously amended) A surface and subsurface operational watercraft capable of
16 resting stationary at bottom of a water body having an elongated body with a midbody region, a
17 forward end which is approximately wedge-shaped in planview with its narrow end forward, and a
18 rearward end which is approximately wedge-shaped in profile view with its narrow end rearward,
19 said elongated body further characterized in having a height in side view adjacent said forward ends
20 which is substantially less than the width of said elongated body adjacent said rearward end, with
21 a midbody height in side view which is substantially larger than the height in side view adjacent said
22 forward end an overall streamlined surface envelope of said elongated body with a total body
23 volume; a primary interior dry volume having a structural midbody portion capable of supporting
24 external water pressures when submerged; and a secondary interior volume which is adapted to be
25 flooded for stationary resting at the bottom of said water body with equal water pressure between
26 water outside and inside said secondary interior volume.
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1 47. (canceled).

2 48. (canceled).

3 49. (canceled).

4 50. (canceled).

5 51. (canceled).

6 52. (canceled).

7 53. (canceled).

8 54. (canceled).

9 55. (previously added) A surface and subsurface operational watercraft having an
10 elongated body with a forward end and a rearward end, said watercraft being further characterized
11 in having:

12
13 a weight and a power means;

14
15 said elongated body having a planform which is generally triangular with a narrow end forward and
16 a broader portion adjacent said stern with said elongated body when floating in static water
17 having a first submerged volume with a profile in side view which is generally a long triangle
18 with base adjacent said forward end and a narrow end adjacent said rearward end;

19
20 said elongated body having right and left lateral wings;

21
22 said watercraft being capable of operating in, at and below the surface of water;

23
24 said first submerged volume generating an upward buoyant force equal to the weight of said
25 watercraft, with said elongated body having a second volume above said first volume
26 sufficient to permit surface operation of said watercraft with a significant positive reserve
27 buoyancy margin;

1 said watercraft being capable of moving forward in water under the action of said power means in
2 an efficient and sustained manner;

3
4 said wings being at least partially submerged when said watercraft is operating at the surface of
5 water at a dive speed;

6
7 said wings at said dive speed operative to generate a downward hydrodynamic force sufficient to
8 overcome the upward buoyant force of said positive reserve buoyancy margin when
9 submerged;

10
11 said wings at a submerged speed operative to generate a downward hydrodynamic force sufficient
12 to counter the lifting forces generated by said second volume when submerged;

13
14 said stern has a broad beam in planview forming the trailing edge of said elongated body;

15
16 with the combined profile shape of said first and second volumes adjacent said rearward end tapered
17 in side view smoothly in a rearward direction with upper and lower surface portions meeting
18 at said rearward end;

19
20 with a movable flap mounted on said rearward end, adapted to be moved downwards to selectively
21 dive said watercraft and pitch down said watercraft, and upwards to selectively climb
22 towards the water surface and pitch up said watercraft.

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24 56. (canceled).

25 57. (canceled).

26 58. (canceled).

1 59. (previously added) A surface and subsurface operational watercraft having a
2 elongated body with a forward and a rearward end, said watercraft being further characterized in
3 having:

4
5 a weight and a power means;

6
7 said elongated body having a planform which is generally triangular with a narrow end forward and
8 a broader portion adjacent said stern with said elongated body when floating in static water
9 having a first submerged volume with a profile in side view which is generally a long triangle
10 with base adjacent said forward end and a narrow end adjacent said rearward end;

11
12 said elongated body having right and left lateral wings;

13
14 said watercraft being capable of operating in, at and below the surface of water;

15
16 said first submerged volume generating an upward buoyant force equal to the weight of said
17 watercraft, with said elongated body having a second volume above said first volume
18 sufficient to permit surface operation of said watercraft with a significant positive reserve
19 buoyancy margin;

20
21 said watercraft being capable of moving forward in water under the action of said power means in
22 an efficient and sustained manner;

23
24 said wings being at least partially submerged when said watercraft is operating at the surface of
25 water at a dive speed;

26
27 said wings at said dive speed operative to generate a downward hydrodynamic force sufficient to
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1 overcome the upward buoyant force of said positive reserve buoyancy margin when
2 submerged;

3
4 said wings at a submerged speed operative to generate a downward hydrodynamic force sufficient
5 to counter the lifting forces generated by said second volume when submerged with the area
6 of said wings (S_w) is no less than the area obtained by dividing the buoyant force (L_{br})
7 generated by said second volume when submerged, by the product of the dynamic water
8 pressure q , at said submerged speed times a non-dimensional lift coefficient CL whence $S_w =$
9 L_{br} / CLq with CL values no less than approximately 0.3 and no greater than approximately
10 1.5 for unflapped wings, and no greater than 2.5 for flapped wings.

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12 60. (canceled).

13 61. (canceled).

14 62. (canceled).

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16 63. (previously added) A surface and subsurface operational watercraft comprising:

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18 a watercraft hull including;

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20 a generally triangular water-engaging section including a pointed bow, horizontally extended stern
21 and generally straight side walls extending divergently from said bow to said stern;

22
23 a generally pyramidal surface section atop said water engaging section having left and right forward
24 wall sections each respectively extending from and engaging the upper edges of one of said
25 side walls and a rear wall section extending upwards from said stern;

26
27 at least two attitude-adjustable water-engaging wings each mounted on and extending outwards from
28

1 a respective one of said side walls of said water-engaging section, said wings operative to
2 control submersion of said watercraft during movement of said watercraft via attitude
3 adjustment thereof; and
4

5 said elongated body having an upper body portion above water level when operating at surface, said
6 upper body portion having an approximately triangular base planform adjacent said generally
7 triangular water engaging section in planform with a forward end; and with generally straight
8 sides free of shoulder curvatures extending divergently from said bow to said stern, with a
9 stern beam substantially larger than a midbody beam, and an approximately triangular profile
10 in side view extending from a location adjacent said forward end to a location adjacent said
11 stern beam substantially free of step discontinuities therebetween.
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13 64. (previously added) The watercraft of claim 63 wherein said triangular profile in
14 side view is modified to be polygonal above the water plane, with the principal surfaces of said upper
15 body portion being faceted between planview and profile.
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17 65. (canceled).

18 66. (canceled).

19 67. (canceled).
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